2007 Annual Report for the Wilma H. Schiermeier Olentangy River Wetland Research Park

THE OHIO STATE UNIVERSITY

WILMA H. SCHIERMEIER
OLENTANGY RIVER
WETLAND RESEARCH PARK

Wetland life in Botswana

In this annual report we focus on collaboration with four countries—China and Korea in Asia, Botswana in Africa, and Costa Rica in Central America.

EARTH University, Costa Rica

Wetlands in China

Executive Summary

This publication is the sixteenth consecutive annual report of the Wilma H. Schiermeier Olentangy River Wetland Research Park (ORWRP). It covers progress in calendar year 2007, the 14th year of hydrologic operation of the two 2.5-acre experimental wetland "kidneys" on the site, the 11th year of ecological development of our 7-acre mitigation wetland "billabong," the 9th year of the Sandefur Wetland Pavilion, the 7th year since the restoration of our bottomland hardwood forest, the 5th year of occupancy of the Heffner Wetland Research and Education Building, and the 3rd year of operation under our Wilma H. Schiermeier Endowment.

This report summarizes research, teaching, and public outreach for the ORWRP for 2007 with an emphasis in this report on international collaborations. This 2007 annual report continues the format chosen in 2006 where activities are summarized with frequent photographs of activity during the year; scientific research results are included separately in peer-reviewed reprints. In 2007, there are 6 such papers, one of which was published in *Science* on strategies for the restoration of the Louisiana Delta wetlands after Hurricane Katrina.

Thirty-five courses from 6 OSU Colleges and 4 other Ohio colleges used the ORWRP in 2007, including 28 supervised graduate and undergraduate students doing research and independent study. One master's degree and two Ph.D.s in wetland science were completed in 2007, raising the total number of theses and dissertations completed at the ORWRP to 53. Short courses on wetland restoration and wetland delineation were taught in 2007 to 26 participants from 11 states. An additional short course on wetland ecology and management was taught in Maun, Botswana, to 15 participants from 5 African countries.

The ORWRP expenditures from grants, contracts, development funds, short courses, endowments, and other accounts were $650,000 in 2007. Research at the ORWRP in 2007 included effects of hydrologic pulsing on wetlands, a statewide network of water quality monitoring, and a 10-faculty research project on monitoring the effects of the pending dam removal on the Olentangy River. That last project had 13 undergraduate student researchers by the end of 2007. ORWRP researchers and graduate students presented 17 national and international papers in 2007; papers were presented or published in the USA, Japan, China, Korea, Botswana, Estonia, and Sweden.

One hundred thirty-six tours or presentations of the ORWRP were given to 2,300 visitors/participants in 2007. Two "Moonlight on the Marsh" distinguished lectures were sponsored by the ORWRP in 2007. On August 30, 2007, Ramesh Reddy, University of Florida, presented results of his study on phosphorus limitation in Florida wetlands, including the Florida Everglades, at the Sandefur Wetland Pavillion at the ORWRP. On October 4, 2007, Jianjian Lu presented results of several wetland restoration projects in China as part of the School of Environment and Natural Resources (SENR) fall quarter seminar series. The ORWRP also sponsored 3 SENR seminars during the spring quarter 2007 seminar series.

International activity is featured both on the cover and in a special section in this annual report. The ORWRP has clearly established an international reputation and that is reflected in both the number of international visitors to the site and the number of invitations that we receive to other countries. In this annual report we focus on research and teaching collaboration with universities in four countries—China and Korea in Asia, Botswana in Africa, and Costa Rica in Central America. In Botswana and China, that collaboration is with fellow institutions in the new Global Wetland Consortium (GWC). The ORWRP was admitted to membership in the GWC in 2007 and is one of only two USA universities in that partnership.

Donations of over $81,000 were secured in 2007 from a record number of 520 donations. Among these are dozens of monthly/pay-period contributions from OSU staff, the numbers of which increase every year.

The direct economic impact of the ORWRP to The Ohio State University from grants, contracts, development, and short course fees over its 15-year history is almost $9 million, including $1.8 million to permanent OSU endowments. Its contributions to wetland science and management, to the education of dozens of public agencies and countries and tens of thousands of the public and students alike, and to the restoration and protection of wetlands and rivers in Ohio and around the world is worth far more than that. It is priceless.

William J. Mitsch, Ph.D., Director
Wilma H. Schiermeier Olentangy River
Wetland Research Park
The Ohio State University
April 1, 2008

Why Wetlands?

Wetlands are shallow to intermittently flooded ecosystems that are more commonly known by such terms as swamps, bogs, marshes, and sedge meadows. They are now revered and protected as important parts of the natural landscape because of their functions in cleaning and retaining water naturally, preventing floods, and providing a habitat and food source for a wide variety of plant and animal species. Yet it is estimated that more than half of the original wetlands in the lower 48 states have been lost to drainage projects and human development projects. Ohio has lost about 90 percent of its original wetlands.

When we lose wetlands, we lose their ability to provide clean water, prevent floods, and enhance biological diversity. Many organizations are calling for creation and restoration of wetlands to clean up our streams, rivers, and lakes and to recover lost habitat. Five million acres of wetlands in the Mississippi River Basin have been suggested as necessary to help prevent the dead zone, or hypoxia, in the Gulf of Mexico.[1, 2] The U.S. Army Corps of Engineers oversees a regulatory program that results in tens of thousands of acres of wetlands being restored and created each year to replace wetlands that are lost to development. Furthermore, the largest wetland restorations in the world, at costs that will exceed $20 billion, are underway in the Florida Everglades, Louisiana Delta, and Mesopotamian Marshlands.[3, 4]

A National Academy of Sciences panel[5] concluded that much more research is needed before we can be assured that those wetlands that are constructed to replace wetlands destroyed for development can be successful. Even though the U.S. Fish & Wildlife Service[6] suggested that there was a net gain of wetlands in the United States from 1998 to 2004, the definition of a wetland remains controversial, as does the question of whether we can create and restore wetlands.

The Vision

The Wilma H. Schiermeier Olentangy River Wetland Research Park is a university campus facility in Ohio, USA, designed to provide teaching, research, and service related to wetland and river science and ecological engineering. At the research park, we seek to understand: 1) how wetlands, rivers, and watersheds function, and 2) if and how we can restore these systems. The 50-acre site itself is a long-term, large-scale riverine wetland research and teaching laboratory. There is no other facility of its kind on any other university campus in the world, so it also has as its mission the dissemination of wetland science and ecological engineering around the world.

The wetland research park is also a nature park, providing habitat for a diversity of plants and animals for the residents of central Ohio to observe and enjoy. It is indeed possible to have a first-rate "living laboratory" that is also appreciated for its ecology and aesthetics in an urban region. A cooperation between the university and its urban neighbors is both symbolic and real at the Olentangy River Wetlands.

History of OSU's Wetlands

The Olentangy River Wetland Research Park is a 50-acre site owned by The Ohio State University, immediately north of Dodridge Road and adjacent to the Columbus campus. The research park is being developed in several phases:

Phase 1 (1992-1994)—Construction of two experimental wetland basins and their water delivery system;

Phase 2 (1994-1999)—Development of a research and teaching infrastructure at the site, including boardwalks, experimental mesocosms, a plant-material greenhouse, additional wetlands, instrumentation for long-term research, and a visitor pavilion;

Phase 3 (2000-2003)—Development and construction of the Heffner Wetland Research and Education Building on the site; and

Phase 4 (2003-present)—International collaborations, river restoration, and urban ecotourism.

The construction of two 2.5-acre deepwater marshes and a river water delivery system was completed in 1994. Pumps were installed on the floodplain to bring water from the Olentangy River to the wetlands and pumping officially began on March 4, 1994. River water has been and continues to be pumped continuously, day and night, into the two wetlands. It then flows by gravity back to the Olentangy River through a swale and constructed stream system. In May 1994, one wetland basin was planted with marsh vegetation typical of wetlands in the Midwest; the other remained as an unplanted control.

Establishing infrastructure for research and education at the site began in 1994 with the construction of boardwalks in the two experimental wetlands (winters of 1995 and 1996) and ended with the dedication of the Sandefur Wetland Pavilion in 1999. That phase also included the creation of the 7-acre naturally flooded oxbow (locally called our billabong) and construction of the mesocosm compound for medium-scale research on wetland function.

Phase 3, the construction of the $2.8 million Heffner Wetland Research and Education Building at the ORWRP, began in 2000 with the receipt of $1.18 million in two Hayes Investment Fund grants from the Ohio Board of Regents. The grants were the result of an effort of a 5-university consortium of Ohio institutions—Ohio State, Wright State, Shawnee State, Youngstown State, and Kenyon College. Most of the remaining support for the building came through donations. The decision to go forward with building construction was made on December 13, 2001. Construction began in spring 2002 and staff and students moved into the building on March 6, 2003. As the building was created, three additional wetlands were developed in the vicinity of the building, including a stormwater wetland that receives runoff from the roof of the Heffner Wetland Building.

Our current Phase 4 involves establishing or joining regional and international collaborations such as the Ohio Center for Wetland and River Restoration (OCWRR) and the Global Wetland Consortium (GWC), as well as the construction of a city bike path shelter, experimental streams, and research access to the Olentangy River itself. This phase also involves fund raising to establish long-term endowments that will ensure that the research and teaching site continues to be part of the Ohio State University for a very long time.

Teaching

Formal University Courses

Thirty-five courses involving 600 students from 6 OSU Colleges and 4 other Ohio institutions used the ORWRP in 2007 for teaching. Course topics included: physical geography (College of Social and Behavioral Sciences): natural history, water quality, and wetland ecology (College of Food, Agricultural, and Environmental Sciences); landscape architecture and ecological engineering (College of Engineering); honors and general chemistry (College of Math and Physical Sciences); veterinary medicine (College of Veterinary Science) and insect ecology, conservation biology, plant population ecology, and ornithology (College of Biological Sciences). Columbus State, Otterbein College, Denison University, and Miami University brought student groups to the ORWRP in 2007 for field trips.

A total of 53 students have completed Ph.D. dissertations, master's theses, or honors undergraduate theses with partial or full use of the Olentangy River Wetland Research Park in the fifteen-year period from 1992 through 2007. One master's student and two Ph.D. students completed their degrees at the ORWRP in 2007. While most students writing theses are from Ohio State departments, there have been five visiting students who completed degrees from European universities (two from the UK, three from Denmark). Currently a visiting graduate student from Ewha Woman's University, Seoul, Korea, is doing her dissertation research at the ORWRP.

Wetland Professional Short Courses

Two short courses were taught in 2007 at the ORWRP—*Wetland Delineation* and *Wetland Creation and Restoration*. The courses were taught in the conference room in the Heffner Wetland Building and attracted 26 participants from 11 states (OH, WV, IN, CT, NH, MD, SC, OK, KS, UT, CA). Participants were primarily from environmental consulting firms and State and Federal agencies and they indicated high satisfaction with the content and location of the courses.

In addition, a short course on Wetland Ecology and Management was taught by Professor William Mitsch of the ORWRP and Dr. Phillippa Huntsman-Mapila of University of Botswana to 14 professionals from 5 African countries (Botswana, Zimbabwe, Nambia, Malawi, and Mozambique) in March 2007. The 5-day course was taught in Maun, Botwana and featured an all-day field laboratory in the Okavango Delta wetland.

Publications/Scholarly Presentations

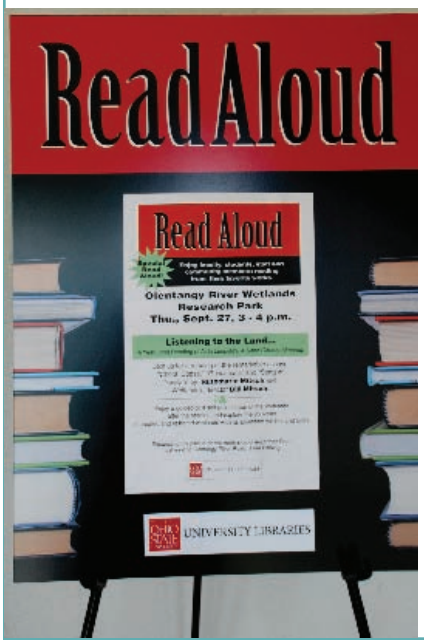
Twenty-nine publications were published or presented by researchers at the ORWRP in 2007 including one book (Wetlands, 4th edition),[3] six peer-reviewed papers, 19 proceeding papers and published abstracts, a research report, and three theses/dissertations. A significant paper was published in *Science* on the restoration potential and approach needed for the Louisiana Delta in the aftermath of Hurricane Katrina.[7] Other papers were published on bottomland hardwood forest biogeochemistry and hydrology,[8] riverine wetland improvement in water quality,[9] and denitrification in created wetlands.[10, 11] Papers were presented or published in the USA, Japan, China, Korea, Botswana, Estonia, and Sweden in 2007.

The editorial office of *Ecological Engineering*, an international journal dedicated to the creation and restoration of ecosystems, continues to be housed in the Heffner Wetland Building at the ORWRP. The journal received 329 manuscripts in 2007 and published 100 papers from 30 countries.

Research

Several research projects were active at the ORWRP in 2007, including funded grants and contracts from the U.S. Environmental Protection Agency on estimating the effects of hydrologic pulsing on wetland function and developing a water quality and nutrient monitoring network in Ohio, the Ohio Department of Development for construction a solar-collector bike path shelter, and the City of Columbus for restoration of the Olentangy River itself. The Olentangy River restoration project is a multi-researcher project that will examine the river before and after a dam is removed from the river adjacent to Ohio State University's campus.

Wetland and river projects that we continue to be involved with include rehabilitation of the Cuyahoga River and Darby Creek in Ohio, restoration of the Mesopotamian Marshlands of Iraq, and Delaware Bay of New Jersey, and comparison of methane emissions and carbon sequestration of tropical and temperate wetlands. With the benefit of a Fulbright Senior Scholar grant, the ORWRP began research collaboration with the University of Botswana's Harry Oppenheimer Okavango Research Centre (HOORC) on biogeochemistry of seasonal floodplains in the Okavango Delta in Botswana (see International Activity, pp. 10-11).



Service

Moonlight on the Marsh Distinguished Lectures

Two ORWRP "Moonlight on the Marsh" distinguished lectures, sponsored by the Jerry and Lenora Pausch Foundation, were held in 2007. On August 30, 2007, Professor K. Ramesh Reddy, Graduate Research Professor and Chair, Soil and Water Science Department, University of Florida, presented "Phosphorus memory in wetlands and aquatic systems: Implications to ecosystem restoration" during an evening outdoor lecture at the Sandefur Wetland Pavilion at the campus wetlands.

On October 4, 2007, Professor Jianjian Lu presented a Moonlight on the Marsh lecture in Kottman Hall entitled "Ecological restoration of wetlands in China." Dr. Lu is Director of Chongxi Wetland Research Centre, Senior Ecologist of the State Key Laboratory of Estuarine and Coastal Research, and Lifetime Professor at East China Normal University, Shanghai, China. Dr. Lu spent two weeks at the ORWRP discussing collaboration between his wetland research centre and the ORWRP.

Other Events

OSU and Environmental Science alum Dr. Brian Reeder, Professor of Biological Sciences at Morehead State University, Morehead, Kentucky, was invited by the ORWRP back to campus to provide a seminar in the School of Environment and Natural Resources on April 5, 2007, and to give advice on academic careers to graduate students at the ORWRP.

The ORWRP hosted a "May Is Wetland Month" gathering on April 30, 2007. The event featured the unveiling of our new lobby display that now features maps of both Ohio and the world with small lights indicating where the ORWRP has had an impact. Outgoing OSU President Karen Holbrook was our distinguished guest at that event. She unveiled the new lobby data wall and was given a plaque designating her as a life-long "Friend of Buckeye Swamp" for the support she gave to the ORWRP during her tenure as President at OSU.

The ORWRP also hosted two other significant events sponsored by other University groups in 2007. On both May 24 and September 27, 2007, the OSU Library held its Aldo Leopold "Listening to the Land" Read Aloud program in our lobby. At the September event, both Ruthmarie Mitsch (College of Humanities) and Bill Mitsch (Director, ORWRP) read from Leopold's classic *Sand County Almanac*.

Tours

Formal tours and presentations of the ORWRP continued to be among our popular public service activities in 2007. Since 1994, the ORWRP has led over 1,350 wetland tours and presentations to almost 26,000 individuals.

The ORWRP conducted 136 tours and public presentations on the Olentangy River Wetland Research Park in 2007 to 2,300 participants. Groups receiving tours ranged from "Take Your Child to Work Day" students to the OSU President's Club Advisory Board. We also assisted at least four departments in their recruitment of students and new faculty.

Distinguished Visitors and Guests

Several distinguished scientists, engineers, and resource managers visited the ORWRP in 2007, including: Jinho Jung (University of Korea); Congressman Paul Gillmor (OH); Jeff Chanton (Florida State University); Rector Ágúst Sigursson and Professor Ása Aradóttir (Agricultural University of Iceland); Brian Reeder (Morehead State University); Casper Bonyongo (University of Botswana); Ramesh Reddy (University of Florida); Karrie-Ann Kubtko (University of Miami); Jianjian Lu (East China Normal University); Chris Korleski (Director Ohio EPA); Bert Kohlman (EARTH University, Costa Rica) and Sean Logan (Director, Ohio Department of Natural Resources). We also were pleased to give a tour to one of Woody Hayes' own—former OSU and Cleveland Browns star Dick Schafrath—in April 2007.

During 2007, we were fortunate to have five international visitors spend considerable time at the ORWRP. These included visitors from China (Jianjian Lu, East China Normal University and Tianhui Wang, Shanghai University), Botswana (Casper Boyongo and Barbara Ngwenya, University of Botswana), and Korea (Keunyea Song, Ewha Woman's University, Seoul).

Publicity

The Olentangy River Wetland Research Park and its research and teaching were publicized 8 times during 2007 in newspaper articles, press releases, and other publications. Stories appeared three times in the *OSU Giving Update* from the University's Development Office, in the *Columbus Dispatch* on the dam removal on the Olentangy River and in *OSU News in Engineering* on Prof. Jay Martin's and his graduate student's work on the control of pathogens by wetlands. Drs. Bill and Ruthmarie Mitsch were featured on the OSU webpage for several weeks in March/April, related to their research in Botswana, his on wetland ecology and hers on African literature.

The ORWRP also receives attention every home football game as students assist in parking cars at the ORWRP for hundreds of Buckeye fans, many of whom are visiting the wetlands for the first time, but a few of whom come back year after year.

International Activity

The Olentangy River Wetland Research Park established or reinforced international connections with a number of laboratories and institutions around the world in 2007. The most important activities were in Botswana, Korea, Costa Rica, and China.

Botswana

ORWRP Director William Mitsch spent 3 months of 2007 in Africa, mostly Botswana, as a Fulbright Senior Specialist in Wetlands Management at the Harry Oppenheimer Okavango Research Centre (HOORC), part of the University of Botswana, in Maun, Botswana. There he established formal wetland research collaboration between HOORC and Ohio State University's ORWRP, both of which are members of the Global Wetland Consortium. Among the tangible outcomes of Professor Mitsch's visit to Botswana were:

- a formal seminar at University of Botswana on "Wetland creation and self-design " on February 6, 2007;
- initial planning for a major international wetland conference "Wetlands in a Flood Pulsing Environment: Effects on Biodiversity, Ecosystem Function, and Human Society" to be held in Maun in February 2010;
- a 5-day short course on Wetland Ecology and Management to 14 professionals from 5 African countries (Botswana, Zimbabwe, Nambia, Malawi, and Mozambique) on Feb 26 – March 2, 2007 (see feedback below);
- establishment of transects on the floodplain of the Okavango Delta in March 2007, including monitoring wells and water level transducers, for long-range collaborative studies on carbon sequestration, productivity, and biogeochemistry of the Okavango by ORWRP and HOORC.

From: Sehenyi Tlotlego, Birdlife Inc.
Maun, Botswana
Hi there Bill,
I really enjoyed working with you last week. I have learnt a lot from you and from the participants, and most of all, the entire network that we have already established is priceless.
….Shex

From: Mokgadi Monamati, Regional Director, Botswana Department of Environmental Affairs,
Maun, Botswana
Thanks prof. We will try our best to make the network active, not just a one time thing. And thanks again for all the information in your Wetlands Bible.
Mokgadi

From: Alexio Mbereko, University of Zimbabwe, Lake Kariba Research Station, Kariba, Zimbabwe
Dear Prof Bill,
It was good being part of the course. I really found the course helpful and hope we can have a follow up course in the same area of science. I will keep in touch. Hope you visit Zimbabwe and take a look at what we have.
Alexio

Korea

We established connections with several Korean universities in 2007. Professor Jiho Jung of Korea University visited the ORWRP in early 2007. Professor Mitsch visited and gave presentations on ecological engineering to both Korea University and Ewha Women's University in Seoul on June 4-5, 2008. Keunyea Song, a Ph.D. graduate student at Ewha Women's University, remained at the ORWRP through 2007 as a visiting scholar.

Costa Rica

The ORWRP has been conducting wetland research in Costa Rica since 2004 as part of collaboration between EARTH University, a small undergraduate university 60 miles from the Atlantic shoreline of Costa Rica, and The Ohio State University. Some of this research has been sponsored by the U.S. Department of Energy. Our early research there involved the investigation of several wastewater treatment wetlands established on the EARTH University campus; results of that study are already published.[12] Research since 2006 has focused on investigation of carbon sequestration and methane emissions from tropical wetlands in Costa Rica. Three main sites for this research include a campus wetland at EARTH University where we had boardwalks installed for easy access; a wetland at La Selva Biological Station tropical rain forest; and periodically flooded riverine wetlands at Palo Verde Biological Station in western Costa Rica near the Pacific coastline.

Several members of the ORW Advisory committee visited the EARTH University research sites on April 16-22, 2007. While at EARTH, advisory committee members Ruth Smart, Tom Flippo, Ruthmarie Mitsch, Tom Singer, Marie Dixon, Sue Kelly and Scott Dagenfield visited the study wetlands at EARTH University and heard presentations from several OSU grad students who are doing research there.

China

Significant exchanges between the ORWRP and China occurred in 2007. We continued to develop collaboration with East China Normal University, Shanghai, China, and specifically with another partner in the Global Wetland Consortium, their Chongxi Wetland Research Centre on Chongming Island in the Yangtze Estuary near Shanghai. This research station, which is adjacent to freshwater tidal wetlands in the lower Yangtze, has many similarities to the ORWRP. Professor Mitsch and ORW advisory committee member Bill Heffner visited the site in June 2007 to establish formal collaboration and we are signing an MOU between our universities to continue that collaboration. Drs. Jianjian Lu and Tianhui Wang from the Chongxi Wetland Research Centre spent several weeks as visiting scientists at the ORWRP in fall 2007.

Other collaboration with China included participation in the World Eco-Summit in Beijing China on May 22-25, 2007, and a conference on wetland restoration and ecological engineering in Nanjing, China, on May 29-31, 2007. The second conference was held to celebrate the 100th birthday of Professor C.H. Chung, a noted wetland scientist in China and, interestingly, a Ph.D. graduate from The Ohio State University in 1935. Sadly, Professor Chung died 9 months later on March 2, 2008.

Development

The Olentangy River Wetland Research Park has been partially supported in its 15 years of development by thousands of private donations to the University. Through December 2007, $4.4 million in cash and in-kind support has been raised for the wetland project, mostly from corporations, foundations, and individuals.

In 2007, there were 520 donations, 34% more than the previous high, totaling $81,000. Over 30 staff at The Ohio State University had payroll deduction donations to the ORWRP in 2007, of which we are enormously appreciative. In 2006, there were 387 donations totaling $211,000. Over the years, more than 15% of the donations (equivalent to almost $700,000) received at the ORWRP have been as in-kind contributions that often do not appear on the accounting sheets.

Future Directions

The emphasis of research at the ORWRP continues to focus in three directions: 1. use of the site facilities for continued wetland experiments and stream and river restoration projects; 2. integration of wetland and river science with collaborating Ohio universities; and 3. increased collaboration on wetland conservation and restoration throughout the world.

ORWRP's Impact

Through 2007, the economic and academic impacts of the Olentangy River Wetland Research Park (ORWRP) on Ohio State University and the world of wetland science have been significant. In the course of its development and operation, the ORWRP has resulted in an economic advantage to the University of almost $9 million in extramural grants and contracts, donations, and short course fees. About $1.8 million of that support has been as endowments that will allow the site to be part of the university setting for a very long time.

Just as important, the ORWRP has contributed to the completion of 53 graduate and undergraduate student theses and Ph.D. dissertations; publication of 144 papers listed in the ORWRP reprint series; leadership of over 1,350 formal wetland tours and presentations for the public to an estimated 26,000 individuals, including K–12 students, university students, garden clubs, campus visitors, and Federal, State, and local public officials.

We also provide a convenient set of campus ecosystems in support of over 280 Ohio State University classes in eight university colleges and many courses from other Ohio institutions, clearly saving those departments and courses significant travel costs and carbon footprints of taking students on field trips far from campus. Our current Ohio Center for Wetland and River Restoration (OCWRR) at the ORWRP has over 70 affiliates from 9 campuses and institutions in Ohio.

The research at the ORWRP has reached around the world, including Botswana, China, Taiwan, Korea, Costa Rica, Iraq, Iceland, and the Louisiana Delta and Florida Everglades in the USA. We joined prestigious company when the ORWRP was admitted to a group of wetland research facilities called the Global Wetland Consortium (GWC; http://www.globalwetlands.org/). The consortium currently has nine wetland research organizations around the world as members; only two are from the USA. Collaborations with two of the GWC partners—the Harry Oppenheimer Okavango Research Centre, University of Botswana and the Chongxi Wetland Research Center, East China Normal University—were strengthened in 2007 through extended visits to both research labs and visits by scientists from both labs to the ORWRP.

In 2008 we hope that our 2007 application to be named a Ramsar Wetland of International Importance becomes a reality, elevating the ORWRP to an even more visible international status.

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Formal university course use in 2007

	Course		Instructor	College
Winter 2007	FAES/SENR/CE 618 Ecological Engineering	44	J. Martin/ V. Bouchard	FAES
	Geography 210, Physical Geography and Environmental Issues	10	Cynthia Dassler	MAPS
	ENR 999 Graduate Student Research	4	William Mitsch	FAES
	ENR 693 Independent Study-Undergrads	1	William Mitsch	FAES
	ENR 760 Ecosystem Modeling	10	Li Zhang	FAES
Spring 2007	VMC 700.08, Preventative Medicine	11	Cliff Monahan	VETSCI
	Art & the Environment Class	20	Shelly Casto	
	EEOB 322, Introduction to Ornithology	29	John Condit	BIOL
	ENR 510, Natural History of Ohio	10	Dave Johnson	FAES
	Landscape Architecture 323 Water in the Landscape	28	Jason Kentner	ENG
	ENR 355 Water Quality Management	13	Virginie Bouchard	FABE
	ENR 999 Graduate Student Research	5	William Mitsch	FAES
	SENR Scholars Program	40	Susie Burks	SENR
	Geography 210, Physical Geography and Environmental Issues	45	Brian Mark	MAPS
	Otterbein College Ecology Class	15	Sarah Bouchard	Otterbein
Summer 2007	Department of Statistics – MBI	15	Terry England	STAT
	ENR 999 Graduate Student Research	3	William Mitsch	FAES
	Biological Sciences, Ecology Lab	25	Indra Sindhu	Columbus State
Fall 2007	EEOB 661, Conservation Biology	10	John Harder	BIOL
	Entomology 641: Insect Ecology	20	David Horn	BIOL
	EEOB 671, Plant Population Ecology	12	Allison Snow	BIOL
	ENR 725 Wetland Ecology	30	Bill Mitsch	FAES
	Geography 210, Physical Geography and Environmental Issues	40	Bryan Mark	MAPS
	BIOL 310 Wetland Ecology	25	Doug Spieles	Denison
	Chemistry H221 General Chemistry Honors	20	Terry Gustafson	MAPS
	Chemistry 221 General Chemistry	40	Susan Olesik	MAPS
	Miami University - grad student research	10	Monica Rakovan	Miami University
	Biology 175	10	Julie Cronk	Columbus State
	ES 899 Environmental Science Seminar	40	Li Zhang/Linying Zhao	BIOL/ESGP
	FABE 999 Graduate Student Research	1	Jay Martin	FAES
	ENR 999 Graduate Student Research	3	William Mitsch	FAES
	ES 999 Graduate Student Research	2	William Mitsch	BIOL
	ENR 999 Graduate Student Research	1	Richard Dick	FAES
	ENR 893 Independent Study-Graduate	6	William Mitsch	FAES
	ENR 693 Independent Study-Undergrads	2	William Mitsch	FAESo

Total number of students 600
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Donation Support for the Olentangy River Wetland Research Park through 2007

Year	Number of donations	Total amount of donations	In-kind donations*	Endowment donations
2007	520	$81,504	$0	$8,483
2006	387	$211,559	$97,909	$5,722
2005	377	$207,972	$4,000	$2,381
2004	332	$1,689,049	$0	$1,518,536
2003	289	$361,569	$71,403	$50,956
2002	264	$365,056	$80,510	$ 445
2001	319	$248,416	$75,000	$1,140
2000	250	$237,077	$31,300	$97,620
1999	165	$115,626	$3,705	$94,000
1998	149	$98,839	$23,624	$4,415
1997	168	$78,228	$13,503	$300
1996	146	$221,889	$18,778	$4,000
1995	108	$97,184	$36,516	$11,000
1994	86	$62,686	$48,744	
1993	46	$259,206	$21,215	
1992	7	$59,347	$6,327	
TOTAL	3614	$4,395,205	$694,889	$1,799,023

* In-kind includes construction of 7-acre billabong in 1996 ($170,000), donation of bottomland forest in 2001 and 2006 ($170,000), earthwork and gravel for building construction (2002-03), paved driveway (2003), civil engineering for building (2003), and vehicles (1999, 2000, 2006)

Active research projects at the Olentangy River Wetland Research Park in 2007

Research Project	Sponsorship
• LSU/OSU Partnership on The Mississippi-Ohio-Missouri (MOM) River Basin Restoration	LSU and OSU
• Carbon Sequestration and Methane Emissions in Tropical and Temperate Freshwater Wetlands	U.S. Department of Energy, Fulbright Foundation, and ORWRP
• Effects of Hydrologic Pulsing on Wetland Function	U.S. Environmental Protection Agency
• Monitoring the Effects of Dam Removal on the Lower Olentangy River	City of Columbus
• Water Quality and Nutrient Monitoring Network in Ohio	U.S. Environmental Protection Agency
• Grave Creek Wetland and Stream Restoration on OSU-Marion Campus	Ohio State University Planning and Real Estate Office
• Amphibians in Natural and Created Vernal Pools in Central Ohio	ORWRP

2007 Publications at the Olentangy River Wetlands

Books

Mitsch, W.J. and J.G. Gosselink. 2007. Wetlands, 4th ed., John Wiley & Sons, Inc., New York, 582 pp.

Peer-Reviewed Papers

Day J.W., Jr., D. F. Boesch, E. J. Clairain, G. P. Kemp, S. B. Laska, W. J. Mitsch, K. Orth, H. Mashriqui, D. R. Reed, L. Shabman, C. A. Simenstad, B. J. Streever, R. R. Twilley, C. C. Watson, J. T. Wells, and D. F. Whigham.. 2007. Restoration of the Missis sippi Delta: Lessons From Hurricanes Katrina and Rita. Science 315: 1679-1684.

Fink, D.F. and W.J. Mitsch. 2007. Hydrology and biogeochemistry in a created river diversion oxbow wetland. Ecological Engineering 30: 93-102.

Hernandez, M.E. and W.J. Mitsch. 2007. Denitrification in created riverine wetlands: Influence of hydrology and season. Ecological Engineering 30: 78-88.

Hernandez, M.E. and W.J. Mitsch. 2007. Denitrification potential and organic matter as affected by vegetation community, wetland age, and plant introduction in created wetlands. J. Environ. Qual. 36: 333-342.

Yanez-Arancibia, A., J.W. Day, R.R. Twilley, and W.J. Mitsch. 2007. Enfoque ecosistémico para restaurar humedales costeros ante los cambios globales. Ambientico 165: 35-38.

Zhang, L. and W.J. Mitsch. 2007. Sediment chemistry and nutrient influx in a hydrologically restored bottomland hardwood forest in Midwestern USA. River Research and Applications 23: 1026-1037.

Other Papers and Published Abstracts

Altor, A.E. and J.F. Martin. 2007. Anaerobic biodigester technology for smaller scale waste flows in temperate climates. American Ecological Engineering Society. Manhattan, Kansas. May 24, 2007.

Lansing, S., R.B. Botero, J.F. Martin, E. Dias Da Silva, and J.C. Kreling. 2007. Optimizing electricity generation and wastewater treat ment in small-scale digesters. American Society of Agricultural and Biological Engineers. St. Paul, MN. June 20, 2007.

Lansing, S., R.B. Botero, J.F. Martin, E. Dias Da Silva, and J.C. Kreling. 2007. Effects of feedstock composition on methane production and waste water treatment in low-tech anaerobic digesters. American Ecological Engineering Society. Manhattan, Kansas. May 24, 2007.

Matlock, M., J.F., Martin, and P. Kangas. Developing a certification in ecological design. American Ecological Engineering Society. Manhattan, Kansas. May 24, 2007.

Mitsch, W.J. 2007. Ecological and social complexity in restoring water resources: Coastal Louisiana, the Mississippi River Basin, and Mesopotamia. Pages 19-23 In: 2006 Stockholm Water Prize Laureates Seminar: Challenges and Opportunities within the Water Sector, Stockholm International Water Institute, Stockholm, Sweden.

Mitsch, W.J. 2007. Restoration of the world's wetlands. Pages 30-37 In: Proceeding, International Symposium on Wetland Restoration 2006: Restoration and Wise Use of Wetlands. Organizing Committee of the Symposium on Wetland Restoration 2006, Shiga Prefectural Government, Otsu, Japan.

Mitsch, W.J. 2007. Ecological Engineering of wetlands: C.H. Chung's legacy and the future of wetland restoration and engineering. Abstracts, Plenary Presentation, Nanjing University, Nanjing, China, May 29, 2007.

Mitsch, W.J. 2007. Ecological engineering—Its promise, past, present, and future Abstracts, Korea University, Seoul, Korea June 4, 2007.

Mitsch, W.J. 2007. Restoration of coastal and riverine wetlands. Abstracts, Plenary presentation, 2nd International Conference on Wetland Pollutant Dynamics and Control (WETPOL), University of Tartu, Tartu, Estonia, September 17, 2007.

Mitsch, W.J. 2007. Ecological Engineering—Its Promise, Principles, and Progress. Abstracts, EcoSummit, Beijing, China.

Mitsch, W.J, A. M. Nahlik, P. Wolski, K. B. Mfundisi, L. Zhang, W. R. L. Masamba, B. Bernal, and P. Huntsman-Mapila. 2007. Tropical wetlands: Seasons, hydrologic pulsing and biogeochemistry. Abstracts, Society of Wetland Scientists 28th Annual Meeting, Sacramento, CA.

Mitsch, W.J. and J.G. Gosselink. 2007. Creating and restoring wetlands. Daweswood Journal 4(2): 4-5. Dawes Arboretum, Newark, OH.

Morgan, J.A. and J.F. Martin. 2007. Effects of different concentrations of dairy wastewater on an ecological treatment system. American Ecological Engineering Society. Manhattan, Kansas. May 24, 2007.

Nahlik, A.M. and W.J. Mitsch. 2007. Methane emissions from tropical wetlands in Costa Rica. Abstracts, Society of Wetland Scientists 28th Annual Meeting, Sacramento, CA.

Roy, E.D., J.F. Martin, and E. Irwin. 2007. Modeling relationships between ecological processes and human development patterns within lacustrine ecosystems. American Ecological Engineering Society. Manhattan, Kansas. May 24, 2007.

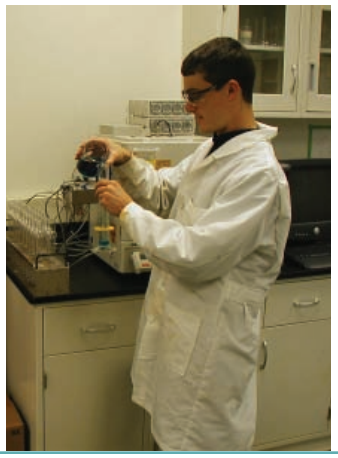
Tremante, V., J.F. Martin, M.F. Quigley, and N.T. Basta. 2007. The effects of organic soil amendments in bioretention soil mixes on the removal of total petroleum hydrocarbons from simulated stormwater. American Ecological Engineering Society. Manhatten, Kansas. May 24, 2007.

Young, C., J.F. Martin, and W.J. Mitsch. 2007. Pathogen removal by constructed wetlands under steady flow and pulsing hydrologic conditions in central Ohio. American Ecological Engineering Society Annual Meeting. Manhattan, Kansas.

Zhang, L. and W.J. Mitsch. 2007. Designing a regeneration zone for the Cuyahoga River Valley: Ecological restoration. Abstracts, EcoSummit, Beijing, China.

Reports

Mitsch, W.J., L. Zhang, and C. Huang. 2007. OSU Marion Campus On-Campus Stream and Wetland Restoration Plan for The Ohio State University at Marion. Report to Planing and Real Estate Office, Ohio State University, Olentangy River Wetland Research Park, The Ohio State University, Columbus, 41 pp.



Theses and dissertations completed through 2007

Ph.D. dissertations (14)

- Anne E. Altor "Methane and carbon dioxide fluxes in created riparian wetlands in the midwestern USA: Effects of hydrologic pulses, emergent vegetation and hydric soils" Environmental Science Graduate Program (2007)
- Daniel Fink "Effects of a pulsing hydroperiod on a created riparian river diversion wetland" Environmental Science Graduate Program (2007)
- Maria E. Hernandez "The effect of hydrologic pulses on nitrogen biogeochemistry in created riparian wetlands in Midwestern USA" Environmental Science Graduate Program (2006)
- Christopher J. Anderson "The influence of hydrology and time on productivity and soil development of created and restored wetlands" School of Environment and Natural Resources (2005)
- Deni Porej "Faunal aspects of wetland creation and restoration" Evolution, Ecology, and Organismal Biology (2004)
- Changwoo Ahn "Ecological engineering of wetlands with a recycled coal combustion byprooduct" Environmental Science Graduate Program (2001)
- John J. Gutrich "Ecological and economic analysis of natural capital: Assessing and modeling the substitutability of mitigation wetlands for natural sites" Department of Agricultural, Environmental, and Developmental Economics (2000)
- Michael A. Liptak "Water column productivity, calcite precipitation, and phosphorus dynamics in freshwater marshes" Environmental Science Graduate Program (2000)
- Douglas J. Spieles "Nutrient retention and macroinvertebrate community structure in constructed wetlands receiving wastewater and river water" Environmental Science Graduate Program (1998)
- Randall J.F. Bruins "Modeling of flooding response and ecological engineering in an agricultural wetland region of Central China" Environmental Science Graduate Program (1997)
- Neal E. Flanagan "Comparing ecosystem structure and function of constructed and naturally occurring wetlands: Empirical field indicators and theoretical indices" Environmental Science Graduate Program (1997)
- Robert W. Nairn "Biogeochemistry of newly created riparian wetlands: evaluation of water quality changes and soil development" Environmental Science Graduate Program (1996)
- Naiming Wang "Modelling phosphorus retention in freshwater wetlands" Environmental Science Program (1996)
- Paul E. Weihe "Colonizing and introduced vegetation in created riparian wetlands: Establishment during the first two growing seasons" Environmental Science Graduate Program (1996)

Master's theses (24)

- Chelsea A. Korfel "Hydrology, physiochemistry, and amphibians in natural and created vernal pool wetlands" School of Environment and Natural Resources (2007)
- Debra Gamble "Tree growth and hydrologic patterns in forested mitigation wetlands" School of Environment and Natural Resources (2006)
- Cassandra L. Tuttle "The effects of hydrologic pulsing on aquatic metabolism in created riparian wetlands" Environmental Science Graduate Program (2005)
- Amanda M. Nahlik "The effects of river pulsing on sedimentation in two created riparian wetlands" Environmental Science Graduate Program (2005)
- Rebecca Swab "Effectiveness of *Lonicera maackii* removal from a bottomland hardwood forest in central Ohio" School of Environment and Natural Resources (2005)
- Tracy J. Tenwalde "Averting and treatment costs regarding nitrogen risk in public water supplies in Columbus, Ohio: Implications for wetland nitrogen sequestration" Department of Agricultural, Environmental, and Development Economics (2005)
- Eric Lohan "A methodology to ecologically engineer watersheds for nitrogen nonpoint source pollution control" Environmental Science Graduate Program (2004)
- Mark Dilly "Atrazine fate in a created wetland" Environmental Science Graduate Program (2003)
- Sarena M. Selbo "Hybridization between native and introduced populations of cattail and big bluestem: Conservation implications" Evolution, Ecology, and Organismal Biology (2002)
- Cheri Higgins "Ecosystem engineering by muskrats (*Ondatra zibethicus*) in created freshwater marshes" Environmental Science Graduate Program (2002)
- Amie M. Gifford "The effect of macrophyte planting on amphibian and fish community use of two created wetland ecosystems in central Ohio" Environmental Science Graduate Program (2002)
- Daniel F. Fink "Efficacy of a newly created wetland at reducing nutrient loads from agricultural runoff" Environmental Science Graduate Program (2001)
- Matthew Cochran "Effect of hydrology on bottomland hardwood forest productivity in central Ohio (USA)" Natural Resources (2001)

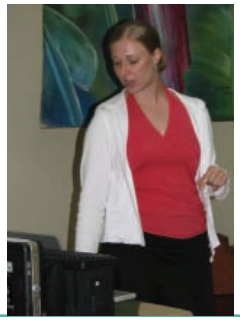
- Sarah K. Harter "Patterns of short-term sedimentation in a freshwater created marsh" Natural Resources (1999)
- Sharon A. Johnson "Effects of hydrology and plant introduction on first-year macrophyte growth in a newly created wetland" Natural Resources (1998)
- Lisa J. Svengsouk "First-year response of *Typha latifolia* L. and *Schoenoplectus tabernaemontani* (K.C. Gmel.) Palla to nitrogen and phosphorus additions in experimental mesocosms" Environmental Science Graduate Program (1998)
- Kathleen D. Metzger "Self-design of a fish community in a created riparian freshwater marsh: A simulation model" Environmental Science Graduate Program (1997)
- John S. Koreny "Hydrology of a constructed riparian wetland system: Characterization and predictive modeling" Environmental Science Graduate Program (1996)
- Uygar Özesmi "A spatial habitat model for the marsh-breeding red-wing blackbird (Agelaius phoeniceus) in coastal Lake Erie wetlands" Environmental Science Graduate Program (1996)
- Doreen M. Dudek "Tree growth responses to streamflow in a bottomland forest in central Ohio" Natural Resources (1995)
- Steven F. Niswander "Functional analysis of a created in-stream mitigation wetland: hydrology, phosphorus retention, and tree growth" Natural Resources (1994)
- Renée F. Wilson "Progress and success of five mitigation wetlands in Ohio" Natural Resources (1995)
- Karen M. Wise "Evaluation of acid mine drainage control by a constructed wetland in southeastern Ohio" Natural Resources (1994)
- Frank D. Voss "Groundwater investigation of Ohio State University wetland site" Geodetic Science (1993)

Undergraduate honors theses (10)

- Katherine E. Kleber "Fish population and movement within planted and naturally colonizing experimental wetlands, autumn 2000" Natural Resources (2000)
- Erika A. Filippi "The role of soil organic matter on denitrification potential in newly created wetlands" Natural Resources (1998)
- Bonnie F. Elfritz "A comparison of natural wetlands with a constructed wetland using the Floristic Quality Assessment Index" Natural Resources (1998)
- Kimberly K. Schamp "Groundwater patterns before and after wetland construction at the Olentangy River Wetland Research Park" Natural Resources (1997)
- Nicole L. Vorwerk "Comparison of three years of pH values between planted and unplanted wetlands at the Olentangy River Wetland Research Park" Natural Resources (1997)
- Rainie D. Gardner "Fish recruitment in the Olentangy River constructed wetlands" Natural Resources (1997)
- Tonya Cheek "Effect of fish on wetland water quality" Natural Resources (1996)
- Andrew W. Wehr "Early water quality of created wetlands at the Olentangy River Wetland Research Park" Natural Resources (1995)
- Michael E. Berkal "Hydrology and water chemistry of the Olentangy River in Worthington (Franklin County), Ohio, and their potential effects on a future constructed wetlands facility downstream in Columbus, Ohio" Natural Resources (1992)
- Douglas G. Stuart "Intensive water quality sampling in two constructed riparian wetlands" Natural Resources (1992)

Theses/research at other universities (6)

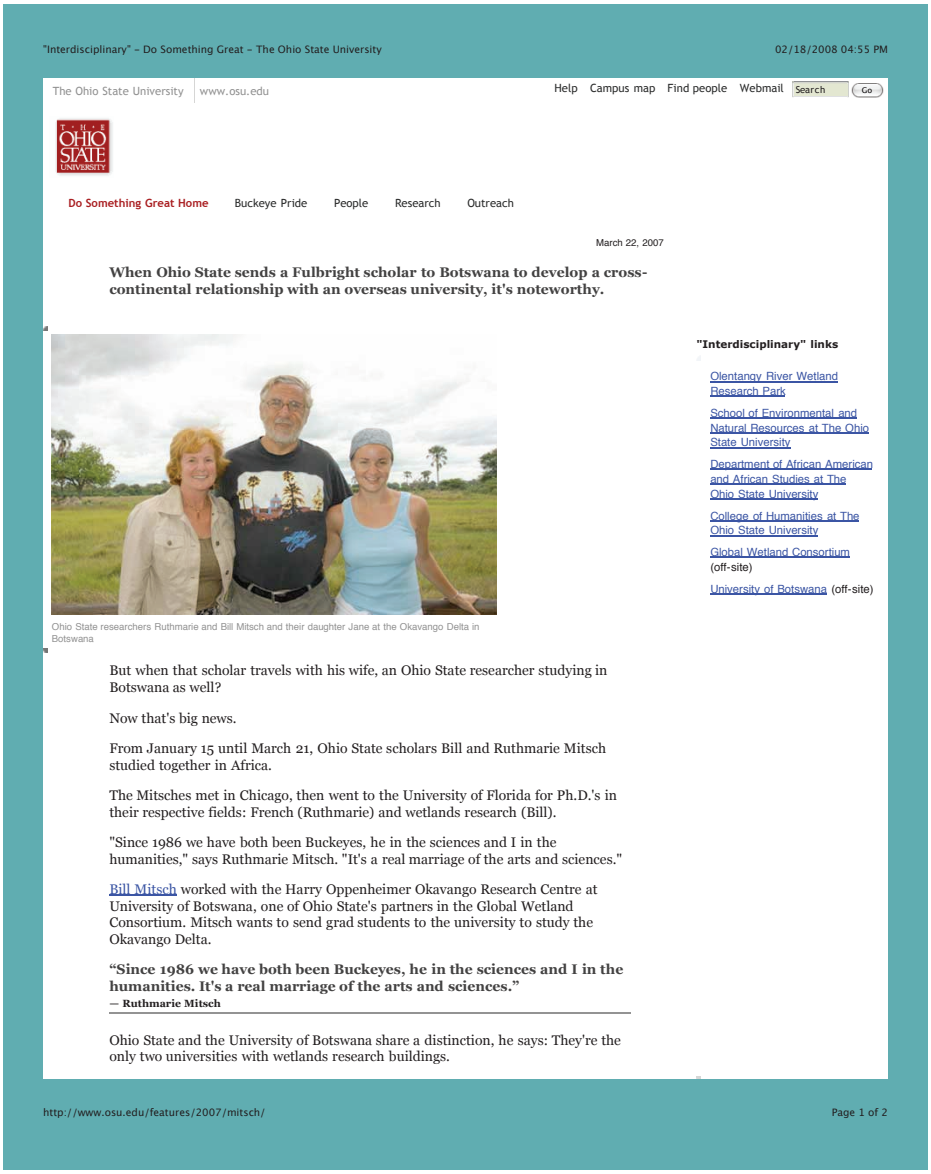
- Chuan Li "Research in forests at Xiashu urban forest in Jiangsu province, China" College of Forest Resources and Environment, Naijing Forestry University, China (in progress)
- Rikki Bronnum "The effects of alachlor on denitrifying bacteria in mesocosms and created wetlands in central Ohio, USA" Master's Thesis, Environmental Chemistry, University of Copenhagen, Denmark (2001)
- Hojeong Kang "The significance of enzyme activities in wetland biogeochemistry" University of Wales, UK (1999)
- Pernille Mortensen and Pernille Lanzky "Water quality improvement in a constructed wetland" Thesis, Royal Danish School of Pharmacy, Copenhagen, Denmark (1996)
- Rebecca Smith "Nitrogen transfer in groundwater in the riparian zone of the Olentangy River, Columbus, Ohio" Thesis, Cambridge University, Cambridge, England, UK (1996)



Olentangy River Wetlands in the press in 2007

Press coverage of Olentangy River Wetland Research Park in 2007

Date	Title	Publications
Winter 2007	Heffner Creates Endowment to Support Wetlands' Site Engineer	OSU Giving Update
Winter 2007	Sipps Establish Annual Wetland and River Research Competition	OSU Giving Update
Winter 2007	The Ohio Wetlands Foundation Gives to Schiermeier Olentangy River Wetland Research Park	OSU Giving Update
March 22, 2007	"When Ohio State sends a Fulbright scholar to Botswana…."	OSU Web Page
July 19, 2007	Channeling Change: Marion Wetlands Project Gains Momentum	onCampus
December 7, 2007	Dam Demolition will leave river smaller, cleaner	The Columbus Dispatch
2007 Annual Report	Finding Solutions	The Ohio State University Foundation
2007 Vol 79, No. 3	Protecting the Olentangy	OSU News in Engineering



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THE OHIO STATE UNIVERSITY

Do Something Great Home Buckeye Pride People Research Outreach

March 22, 2007

When Ohio State sends a Fulbright scholar to Botswana to develop a cross-continental relationship with an overseas university, it's noteworthy.

But when that scholar travels with his wife, an Ohio State researcher studying in Botswana as well?

Now that's big news.

From January 15 until March 21, Ohio State scholars Bill and Ruthmarie Mitsch studied together in Africa.

The Mitsches met in Chicago, then went to the University of Florida for Ph.D.'s in their respective fields: French (Ruthmarie) and wetlands research (Bill).

"Since 1986 we have both been Buckeyes, he in the sciences and I in the humanities," says Ruthmarie Mitsch. "It's a real marriage of the arts and sciences."

Bill Mitsch worked with the Harry Oppenheimer Okavango Research Centre at University of Botswana, one of Ohio State's partners in the Global Wetland Consortium. Mitsch wants to send grad students to the university to study the Okavango Delta.

"Since 1986 we have both been Buckeyes, he in the sciences and I in the humanities. It's a real marriage of the arts and sciences."
— Ruthmarie Mitsch

Ohio State and the University of Botswana share a distinction, he says: They're the only two universities with wetlands research buildings.

"Interdisciplinary" links

Olentangy River Wetland Research Park

School of Environmental and Natural Resources at The Ohio State University

Department of African American and African Studies at The Ohio State University

College of Humanities at The Ohio State University

Global Wetland Consortium (off-site)

University of Botswana (off-site)

http://www.osu.edu/features/2007/mitsch/ Page 1 of 2

FOOD, AGRICULTURAL AND ENVIRONMENTAL SCIENCES

Heffner Creates Endowment to Support Wetland's Site Engineer

In 2003, **Bill Heffner**, president of **Agg Rok Materials Company** of Grove City, Ohio, provided major support for the new wetland research facility at the Wilma H. Schiermeier Olentangy River Wetland Research Park. He recently expanded his generosity to include an endowment in support of the site engineer.

Ryan Younge, who holds this post, began at the facility as a volunteer. After putting in hard work for a quarter, he was asked by **William J. Mitsch**, director of the Wetland Research Park and professor of natural resources and environmental science, to join the staff as a paid employee.

"My daily tasks vary, but the most important thing I do is make sure the pump system is running smoothly. I make sure that the pumps are at a steady flow or whatever flow we need," Younge said. Other duties, he noted, are installing and calibrating the water quality measuring devices for Yellow Springs International equipment, overseeing maintenance jobs, lawncare in the warm months, and removing graffiti when incidents occur. "I work to fix things around the wetlands that are broken or have shut down, and I carry out basic tasks that keep the place running and looking nice."

Younge describes Heffner's support as wonderful and affording him the opportunity to gain real-world experience in his field of study. "This is a great step to getting my feet wet," he added. "I cannot thank Mr. Heffner enough for supporting my position and the Wetland Research Park, the place I work and love."

Bill Heffner and Ryan Younge, site engineer at the Wetland Research Park.

Protecting the Olentangy

Nikki Skrinak's research takes her out of the classroom to the waters of the Olentangy.

"I love getting out of the classroom and taking samples along the Olentangy River and at the Olentangy River Wetland Research Park," she says.

Skrinak is studying the effects of dam removal and sewer overflows on the concentration of pathogens in the Olentangy River. Many environmental groups argue that dams have a negative effect on the diversity of life and quality of water in rivers. Skrinak is testing the quality of the water in the river now and will continue to do so once the river's Fifth Avenue dam is removed in 2008.

"By collecting water quality data before the dam is removed, researchers in the future can make quantitative comparisons with water quality data after the dam is removed," she says.

Skrinak, a senior in food, agricultural and biological engineering, got involved with undergraduate research after taking several courses with her advisor, Jay Martin, associate professor of ecological engineering.

"Dr. Martin has taught me to take the engineering skills I learn at OSU and apply them outside the classroom," says Skrinak.

After graduation, Skrinak plans to earn dual master's degrees in rural sociology and ecological engineering at Ohio State. This combination of studies, she says, integrates engineering, science, technology and outreach management to applications in sustainability. Eventually, she wants to earn a doctorate in bio-environmental engineering and become a professor.

"My research experience has helped prepare me for a career in academia by teaching me how to build relationships and communicate with graduate students and faculty," she says. "It also exposed me to grant writing, experimental design and departmental administration."

—Rachel Lichtenfeld

JO MCCULLY

Senior Nikki Skrinak collects water samples from the Olentangy River Wetland Research Park to measure pathogens.

10 July 19, 2007 onCampus

Channeling change

Marion wetlands project gains momentum

JULIA HARRIS onCampus staff

When some people look at the muddy creek running through Ohio State Marion's campus, they only see a ditch. But when Bob Klips, an associate professor of evolution, ecology and organismal biology, looks at the same ditch, he sees an opportunity for change.

Grave Creek, as the ditch is officially known, is the site of a proposed restoration project undertaken by Klips and a team of environmentally minded faculty on both the Marion and main campuses. Covering a swath of creek not quite a mile in length, the proposal calls for creating a new, more naturally curving channel that will be able to accommodate flood patterns and sustain an educationally valuable habitat. That habitat includes a roughly 1.5-acre wetland that will improve the water quality of Grave Creek itself.

"Wetlands are like nature's kidneys: They're actually able to filter water," explained Bill Mitsch, director of the Wilma H. Schiermeier Olentangy River Wetland Research Park in Columbus. Water quality testing at the Marion site indicates that runoff from agricultural fields has made Grave Creek high in phosphorous and nitrates, chemicals that could be reduced by a wetlands.

The current channel of Grave Creek

The Marion wetlands also will function like an aquatic outdoor lab where faculty and students can conduct experiments and learn about ecology.

The tradition of environmental education is one the Marion campus is proud to continue. It is already home to the Prairie Nature Center, a 10-acre plot of land complete with a pond and garden that hosts educational activities for university and community students. To Klips, who cheerfully describes himself as a "tree-hugging environmentalist," the wetlands project is a logical extension of that commitment to a responsible management of natural resources.

"The practice in rural counties like ours has been to facilitate drainage in a heavy-handed or aggressive way, by clearing all the natural vegetation and dredging out material to create these straight and smooth channels," Klips said. "That happened not just with Grave Creek but with several other creeks and ditches in Marion County."

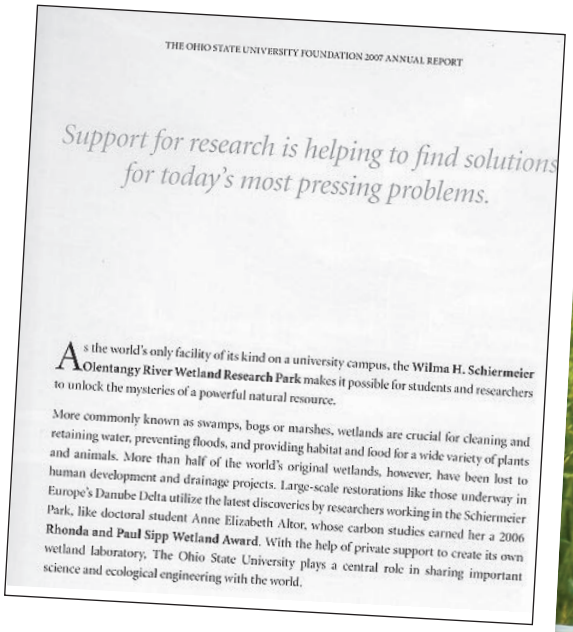
Mitsch said the kind of damage done to Grave Creek is typical not just of Marion streams but to waterways all over the Midwest. The result has been artificial systems that have to be maintained by county engineers — which means that every so often, the vegetation gets mowed, the channels get dredged and the local ecology gets disrupted all over again.

"We decided to come up with a system that can take care of itself and let the engineers off the hook," Mitsch said.

The system they came up with, after months of careful planning and testing, comes with an estimated price tag of $300,000. The funds will likely be paid by Marion County developers as part of a legal bartering system known as mitigation. If all goes as hoped, Mitsch said, the dirt should start flying next year as 16,900 cubic yards of soil are excavated for the new stream channel.

The plan also recommends construction of

A bird searches for fish in the waters of Marion's Grave Creek.

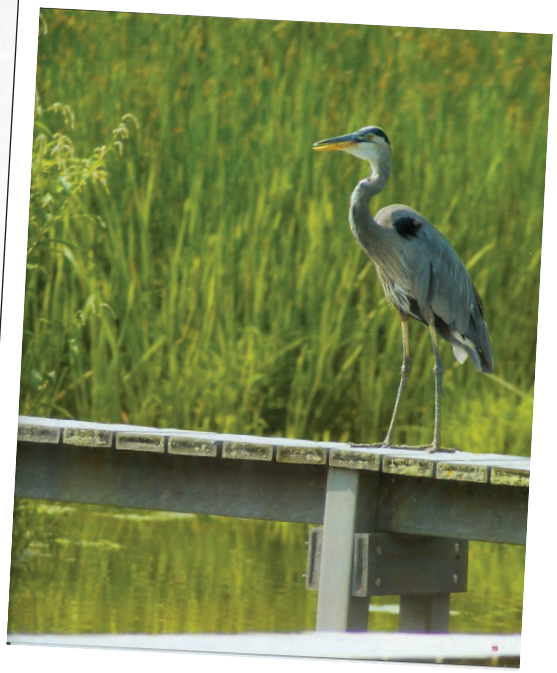


THE OHIO STATE UNIVERSITY FOUNDATION 2007 ANNUAL REPORT

Support for research is helping to find solutions for today's most pressing problems.

As the world's only facility of its kind on a university campus, the **Wilma H. Schiermeier Olentangy River Wetland Research Park** makes it possible for students and researchers to unlock the mysteries of a powerful natural resource.

More commonly known as swamps, bogs or marshes, wetlands are crucial for cleaning and retaining water, preventing floods, and providing habitat and food for a wide variety of plants and animals. More than half of the world's original wetlands, however, have been lost to human development and drainage projects. Large-scale restorations like those underway in Europe's Danube Delta utilize the latest discoveries by researchers working in the Schiermeier Park, like doctoral student Anne Elizabeth Altor, whose carbon studies earned her a 2006 **Rhonda and Paul Sipp Wetland Award**. With the help of private support to create its own wetland laboratory, The Ohio State University plays a central role in sharing important science and ecological engineering with the world.




The Ohio State University
The Lenora and Jerry Pausch
Moonlight on the Marsh Lecture
Thursday, Oct. 4, 2007
LECTURE begins at 3:30 p.m.
103 Kottman Hall with video link to 123 Williams Hall in Wooster
2021 Coffey Rd.
Columbus, OH
Ecological Restoration of Wetlands in China
Jianjian LU, Ph.D.
Director of Chongxi Wetland Research Centre
Senior Ecologist of State Key Laboratory of Estuarine and Coastal Research
Livetime Professor of East China Normal University, Shanghai, China
Xixi and Chongxi Wetland Parks are among more than 100 wetland parks which have recently been constructed in China. The main purpose is to increase the ecological service of biodiversity conservation, water decontaminating and recreation at the wetland. The processes of wetland park construction are divided into 4 stages: reconnaissance, design and planning, restoration and construction, management monitoring.
Both the Xixi and Chongxi Wetland Parks were used for fish-farming. The restoration projects were started two years ago. Bird habitats were recreated by forming micro-biotope artificially and replenishing bird food (such as small fish and macro benthos) naturally. Forested wetlands were restored for raising the function of water purification (N and P maintenance). Some primary results are discussed for the improvement of future study of wetland restorations.
Jianjian LU received a BSc in Biology from the East China Normal Universityin 1978; a MSc in Animal Ecology from the East China Normal University in 1981; and a PhD. in Ecology & Zoology from Washington State University, USA in 1985.
For more information: 614/247-7984 or noon.5@osu.edu
Sponsored by:
Lenora and Jerry Pausch Foundation
The Wilma H. Schiermeier Olentangy River Wetland Ressearch Park
School of Environment and Natural Resources
You are cordially invited to Picnic at the Swamp
and the Lenora and Jerry Pausch
Moonlight on the Marsh Lecture
Thursday, Aug. 30, 2007
PICNIC grounds open at 6:00 p.m. — bring your own food, blanket & family
LECTURE begins at 7:30 p.m.
Sandefur Wetland Pavillion
The Wilma H. Schiermeier Olentangy River Wetland Research Park
352 W. Dodridge Street
A tour of the wetlands will be given prior to the lecture.
Phosphorus Memory in Wetlands and Aquatic Systems: Implications to Ecosystem Restoration
K.R. Reddy
University of Florida, Soil and Water Science Department
Wetland Biogeochemistry Laboratory
Wetlands and aquatic systems such as lakes are often the final recipients of nutrients discharged from adjacent terrestrial ecosystems. Since many freshwater systems are phosphorus (P) limited, loading of this nutrient is of particular concern to environmental managers. Nonpoint sources of P dominate eutrophication processes of many wetlands and aquatic ecosystems. Thus, in many situations, alternative land use management practices in the watershed are implemented in an effort to reduce the overall load to receiving water bodies. The key questions often asked are: (i) will wetlands and aquatic systems respond to P load reduction?; (ii) if so, how long will it take for these systems to recover and reach its background condition?; (iii) what biogeochemical processes regulate the mobilization of internally stored phosphorus; and (iv) are there any economically feasible management options to hasten the recovery process? Once the external P loads are reduced, the internal memory of P can extend the time required for a wetland or an aquatic system to recover from eutrophic status to more background levels. The lag time for recovery should be considered in developing management strategies to restore wetlands and aquatic systems. This presentation will include a discussion on a range of biogeochemical and hydrodynamic processes regulating the mobilization of P stored within the system.
Dr. K. Ramesh Reddy is Graduate Research Professor and Chair, Soil and Water Science Department, University of Florida. Dr. K. Ramesh Reddy obtained a B.S and M.S., 1965 and 1967, respectively, from A.P. Agricultural University, India, and a Ph.D degree from Louisiana State University in 1976. For the last 35 years, Dr. Reddy has worked in wetlands and aquatic systems. Dr. Reddy's areas of expertise and research include: biogeochemistry, wetlands and aquatic systems, soil and water quality, and ecosystem restoration.
For more information: 614/247-7984 or noon.5@osu.edu
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School of Environment and Natural Resources

Sipps Establish Annual Wetland and River Research Competition

Paul and Rhonda Sipp of Columbus, Ohio, have established an endowment for the Wilma H. Schiermeier Olentangy River Wetland Research Park to provide annual awards for undergraduate and graduate students who are conducting wetland and river research.

"My family and I chose to make this gift because I have always been fascinated by swamps and their role in nature," said Paul Sipp, president of Turkey Run Inc. and a 2004 Ohio State graduate with an MBA from the Fisher College of Business. "I am particularly interested in research that may result in the use of wetlands to solve or prevent modern problems." The research can be basic or applied but should be part of a university research effort by a center institution. Affiliates of the center are from Ohio State, Shawnee State University, Wright State University, Youngstown State University, Kenyon College, Central State University and Ashland University.

Students receiving the awards can be in any phase of research and must be able to provide a written report of progress at the end of 2007. The support can be for an existing research project or can be provided to initiate a new research direction that otherwise was not possible. The undergraduate award is $500; the graduate amount is $1,000.

Gwyn Elaine Boehringer, a doctoral student in the Environmental Sciences Program at Wright State University, won the 2006 Rhonda and Paul Sipp Wetland Award of $1,000 for her proposed research on trace pollutant bio-degradation in constructed wetlands. Originally from the Dayton, Ohio, area, Boehringer earned her bachelor's degree from Wright State in 1993 and returned for a master's degree in environmental sciences in 2003. Between degrees, she worked at NCR Corporation in Dayton, as an environmental and safety manager.

Anne Elizabeth Altor, a doctoral student in the Environmental Science Graduate Program at Ohio State and a researcher at the Olentangy River Wetland Research Park, won second prize of $500 in the competition to carry out additional carbon research in the experimental wetlands this spring and summer during extreme drawdowns and reflooding. Altor earned her bachelor's degree in 2003 from SUNY College of Environmental Science in Syracuse, N.Y.

Paul Sipp (wearing tan shirt in center of front row) is shown with members of the Wetland Advisory Committee in November.

Wilma H. Schiermeier Olentangy River Wetland Research Park

Heffner Wetland Research and Education Building
352 W. Dodridge Road, Columbus, OH 43202-1574 USA
(near intersection of Olentangy River Road and Ackerman Road/Dodridge Road)

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MS Students: Blanca Bernal, Heather Fair, Kurt Keljo, Joni Lung, Charissa Young
Ph.D. Students: Taniya Chowshury, Jinguo Gao, Jung-Chen Huang, Amanda Nahlik, Keunyea Song, Kay Stefanik, Evan Waletzko
Volunteers/Undergraduate Researchers: Nick Bellizzi, Ken Herman, Kate Jones, Alex Prange Allison Sendelbach, Nikki Skrinak, Alex Tobergte, Justin Walters

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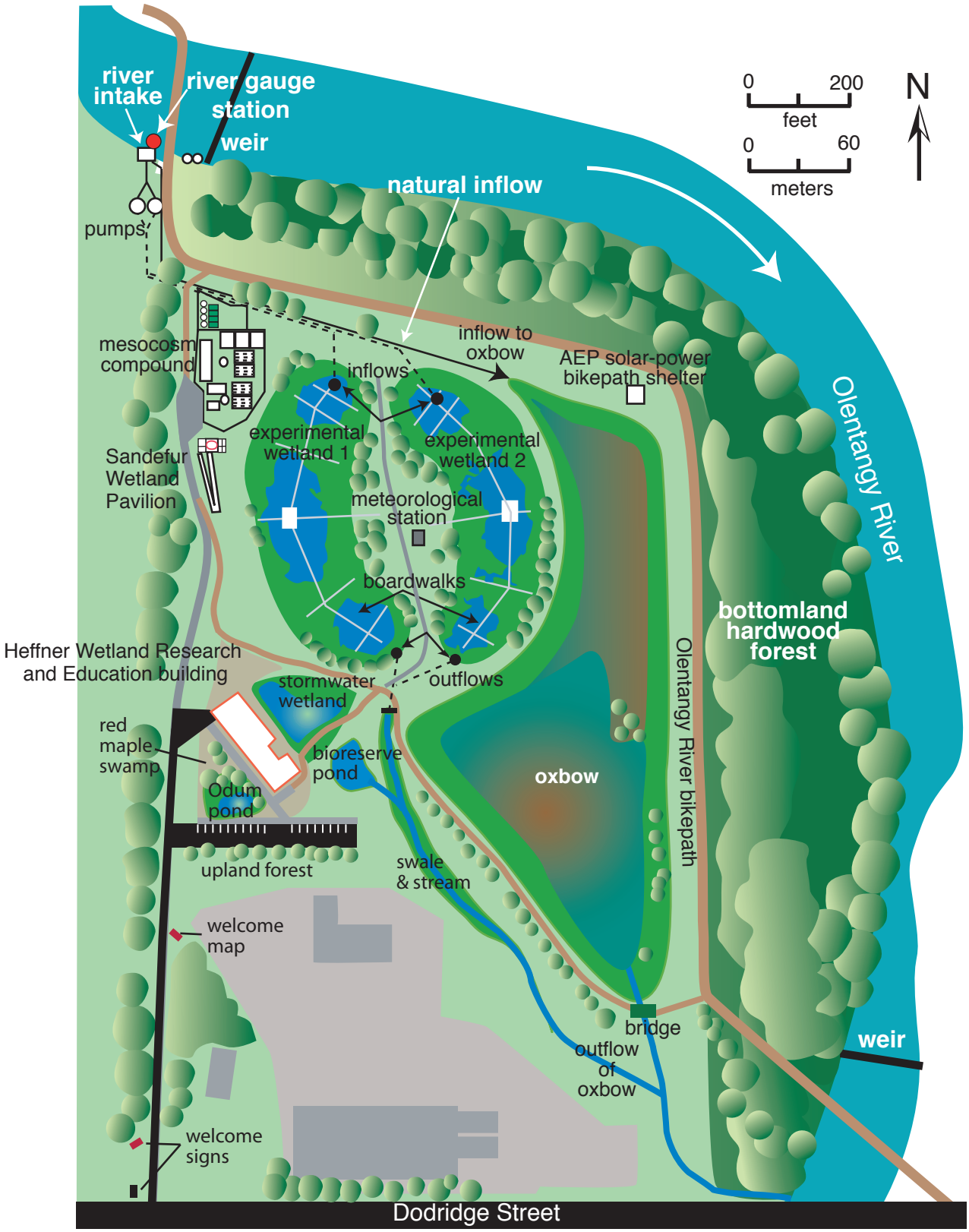

Wilma H. Schiermeier Olentangy River Wetland Research Park
The Ohio State University

WILMA H. SCHIERMEIER

OLENTANGY RIVER
WETLAND RESEARCH PARK

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